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A review of perinatal mortality in an urban situation in a developing country

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1 Introduction

Perinatal mortality statistics are the best indications of perinatal health available within a community [4]. Although detailed and reliable surveys are available in developed countries, in Africa reports have tended to be hospital based and have not included all deliveries in the community under consideration. The last report from Zimbabwe was in 1975 [5], although this did include the majority of deliveries it excluded those occurring at home, and those in private health care facilities.

The purpose of the present survey was to review as far as possible all of the perinatal deaths occurring in the city of Harare, Zimbabwe.

2 Patients and methods

The maternity services within Harare consist of three maternity hospitals together with municipality – run urban maternity clinics in the residential suburbs:

Mbuya Nehanda Maternity Hospital and the Avenues Clinic deliver both high and low obstetric risk women under the care of private obstetricians. Harare Maternity Hospital is a referral center for high risk patients from the Municipal clinics in the high density urban suburbs. These clinics are staffed by nurse midwives and maternity assistants who care for the low risk obstetric patients during the antenatal period, labor and the puerperium [6].

All births taking place within the above maternity services during 1983 were analyzed. An estimate of the number of patients giving birth within the city but outside these services was made after consultation with the City Medical Officer.

All cases of perinatal deaths were analyzed to assess the cause of death, the registration status of the mother, and birthweight of the baby. Due to the problem of data collection not all aspects are known for all deaths. An estimate of perinatal deaths occurring outside the maternity services was also made from the City Medi-

Curriculum vitae

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cal Officer's annual report [3], newspaper reports of baby dumping and after consultation with the City Social Services and the Police.

Definitions and terminology

The following definitions were used in the analysis:

Stillbirth: An infant born dead weighing ≥ 500 g

Early neonatal death: An infant weighing ≥ 500 g and dying within the first 7 days of life

Perinatal death: Stillbirth or early neonatal death weighing ≥ 500 g

Perinatal mortality rate:

$$\frac{\text{Number of perinatal deaths 1000}}{\text{Number of births}}$$

To enable international comparison to be made the perinatal mortality rate was also calculated using only infants weighing 1000 g or more as recommended by WHO [7].

3 Results

There were an estimated 53,665 total births and 2103 perinatal deaths in Harare during 1983. Table I shows where the births occurred: 50,138 (93.4%) were delivered within the hospitals or clinics, 972 (1.8%) were born before arrival (BBA) to the maternity service. An estimated 2555 (4.8%) were not born within the city maternity services.

The number of perinatal deaths within the city during 1983 (divided into stillbirths and early neonatal deaths where information was available) is shown in table II.

Table I. Total number of births in Harare during 1983.

	Total	%
Harare Maternity Hospital (HMH)	21,336	39.8
Harare Maternity Clinics	24,007	44.7
Mbuya Nehanda Maternity Hospital (MN)	4,500	8.4
The Avenues Clinic	295	0.5
Total hospital/Clinic births	50,138	93.4
BBA's Harare Maternity Hospital	354	0.7
BBA's Clinics (estimated)	504	0.9
BBA's Mbuya Nehanda Maternity Hospital	114	0.2
Total BBA's hospital/Clinics	972	1.8
Total births outside hospital/clinics (estimated)	2,555	4.8
Total number of births	53,665	100.0

One thousand seven hundred and fourteen (81.5%) perinatal deaths occurred from babies born in the hospitals or clinics, and 134 (6.4%) from babies born before arrival at maternity services. An estimated 255 (12.1%) of deaths occurred elsewhere. Those infants which were born before arrival made up 1.8% of the total births and accounted for 6.4% of the total

Table II. Number of perinatal deaths in Harare during 1983.

	Stillbirths	Early neonatal deaths	Perinatal deaths	%
Harare Maternity Hospital (HMH)	869	622	1491	70.9
Harare Clinics	57	15	72	3.4
Mbuya Nehanda Hospital (MN)	78	70	148	7.1
The Avenues	2	1	3	0.1
Total perinatal deaths in hospital/clinic	1006	708	1714	81.5
BBA's (HMH/Clinics)	51	69	120	5.7
BBA's (MN)	1	13	14	0.7
Total perinatal deaths amongst BBA's	52	82	134	6.4
Total perinatal deaths outside hospital/clinic (estimated)	146	109	255	12.1
Total	1204	899	2103	100.0

perinatal deaths. Of the 53,665 births within the City of Harare during 1983, 47,285 (88%) were booked for antenatal care at either a Municipal clinic or hospital. Six thousand three hundred and eighty (12%) patients did not register for antenatal care, and 909 (43.2%) perinatal deaths occurred in the unregistered group of patients (table III).

The overall perinatal mortality rate (PNMR) was 39.2/1000. For registered patients the PNMR was 25.3/1000. Unregistered patients had a considerably higher PNMR of 142.5/1000. 1685 (80.1%) perinatal deaths were in infants weighing 1000 g or more, 418 (19.9%) perinatal deaths occurred from infants weighing less than 1000 g. The perinatal mortality rate for infants weighing 1000 g or more was 31.6/1000.

3.1 Classification of deaths

The 2103 perinatal deaths were analyzed as to clinical cause of death where possible as shown in table IV. This classification of perinatal death has been the method of recording perinatal mortality over several years at Harare Maternity Hospital [5].

Unexplained stillbirth, immaturity, intrapartum asphyxia and antepartum hemorrhage were the principal cause of death accounting for almost 60% of the total perinatal mortality.

Classification by clinical cause has been criticized as being highly subjective [8] and a suggestion has been made that a simplified pathological sub-grouping classification combined with a breakdown of perinatal mortality by birthweight may be a more useful classification. The perinatal deaths in Harare during 1983 were analyzed using the WIGGLESWORTH classification [8] and the results are shown in table V.

4 Discussion

This review shows the overall perinatal mortality rate in the City of Harare during 1983 to be 39.2/1000 births. For the 88% of women who registered for antenatal care, the perinatal mor-

Table III. Number of births and perinatal deaths in 1983 analyzed into registered and unregistered.

	Total patients	Registered patients	Unregistered patients
Number of births	53,665	47,285 (88%)	6,380 (12%)
Perinatal deaths	2,103	1,194 (56.8%)	909 (43.2%)

Table IV. Harare classification of perinatal deaths — 1983.

	Number of Perinatal Deaths	% of all PND	Incidence/ 1000 births
Immaturity	413	19.6	7.7
Macerated unknown	358	17.0	6.7
Intrapartum asphyxia	294	14.0	5.4
Antepartum hemorrhage	170	8.1	3.2
Congenital malformation	118	5.6	2.2
Hypertensive disease	113	5.4	2.1
Cord prolapse	68	3.2	1.3
Fresh unknown	64	3.0	1.2
Intrauterine infection	48	2.3	0.9
Syphilis	22	1.1	0.4
Other	435	20.7	8.1
Total	2103	100.0	39.2

Table V. Classification of perinatal deaths — Harare 1983 (WIGGLESWORTH — 1980).

Birthweight in gram	Normally formed stillbirth	Congenital malformation	Immaturity	Asphyxial	Other	Total
<1000	108	11	213	60	25	417
1000–1499	93	19	141	57	42	352
1500–1999	75	28	62	75	32	272
2000–2499	69	16	7	75	24	191
⩾2500	111	37	1	277	35	461
Unknown	15	7	11	30	347	410
Total	471	118	435	574	505	2103

tality rate was 25.3/1000. This figure is similar to that found by AGGARWAL and MATI [1] in their survey of perinatal deaths occurring at Kenyatta National Hospital in Nairobi.

The perinatal mortality rate for women who do not register for care is alarmingly high (142.5/1000) although this group probably represents the lowest socio-economic section of the country. This group of women requires further intensive study to establish why they did not book for care and to establish preventable factors for perinatal death.

The authors found it extremely difficult to compare perinatal mortality results with those from other parts of Africa and the world. A variety of definitions are used and in many papers there is no indication of the definition used for the various parameters. We have used the recommendations of the FIGO Committee of Perinatal Mortality and Morbidity and strongly recommend that other surveys use the same terminology. A second problem arises with the classification of perinatal deaths. Most developing countries are unable to perform post mortems on more than a few of the deaths which makes classification of deaths with precision impossible. We have in the past classified our deaths according to the clinical headings shown in table IV. We now find the WIGGLESWORTH classification (table V) increasingly useful. The groupings of cause of death are clear and unequivocal and breaking these down by birthweight gives important basic information. We believe the continued use of this classification will enable easier surveillance of trends in perinatal mortality within the city. An alarming feature in Harare for example, is the large number of asphyxial deaths occurring in infants weighing over 2500 g. We believe that the collection of routine perinatal death information is an essential part of any obstetric service, but this collection loses some of its meaning if the basic data for birthweight, maternal age, etc are unknown for the whole obstetric population. We have piloted the use of a minimum basic data set [2], the information from which has been used in a report to the Ministry of Health. The birthweight distribution for our population, derived from this survey, is shown in table VI. The characteristics of the perinatal deaths compared with the general obstetric population will be the subject of a further report.

Table VI. Birthweight distribution of the obstetric population.

Birthweight	% Obstetric population
< 1000 g	1.3
1000–1499	0.8
1500–1999	2.0
2000–2499	7.2
2500–2999	28.3
3000–3499	40.6
3500–3999	17.1
4000–4499	2.6
≥ 4500	0.1

Summary

Perinatal deaths occurring within the City of Harare, Zimbabwe, during 1983 were studied. Data were collected from all known deliveries within the city. This included exact numbers from three central maternity hospitals, and from referring midwife – run maternity clinics. An estimate was made of the number of births and perinatal deaths occurring within the city, but outside these official maternity facilities.
All perinatal deaths were reviewed. The birthweight, the cause of death, and the antenatal care registration status of the mother were established.
There were 2103 perinatal deaths from an estimated 53,665 total births. Deliveries include 50,138 (93.4%) in hospitals or clinics, 972 (1.8%) before arrival to the maternity service, and an estimated 2555 (4.8%) outside the city maternity services (table I).
One thousand seven hundred and fourteen (81.5%) perinatal deaths occurred in hospital or clinic delivered babies, and 134 (6.4%) from babies delivered before arrival at medical services. An estimated 255 (12.1%) of deaths occurred elsewhere (table II).
A total of 6380 (12%) patients did not register for antenatal care. There were 909 (43.2%) perinatal deaths in this unregistered group of patients.
The overall perinatal mortality rate (PNMR) for infants weighing 500 g or more was 39.2/1000. For registered patients the PNMR was 25.3/1000 and for unregistered patients, 142.5/1000. For infants weighing 1000 grams or more the PNMR was 31.6/1000.
The causes of death in the 2103 perinatal deaths were established and classified by clinical cause (table IV) and by a simple pathological grouping with breakdown by birthweight [8] (table V).
Comparison with perinatal mortality in other countries is difficult because of the wide variety of definitions used and undefined terminology noted in many papers. The recommendations of the FIGO Committee on Perinatal Mortality and Morbidity were used in this review, and we strongly recommend that they become universally adopted.
The classification of perinatal deaths of recommended by WIGGLESWORTH (table V) was found to be clear and simple to use and provided important basic data with birthweight tabulation. We hope to continue to use this classification to monitor trends in perinatal mortality within the city.

Keywords: Classification, definitions, perinatal death, registered/unregistered patients.

Zusammenfassung

Perinatale Mortalität unter urbanen Verhältnissen in einem Entwicklungsland
Wir untersuchten perinatale Todesfälle, die 1983 innerhalb des Stadtgebietes von Harare, Zimbabwe, aufgetreten waren. Von allen uns bekannten Entbindungen in der Stadt wurden die Daten erfaßt. Genaue Zahlen erhielten wir von den drei zentralen Entbindungskliniken sowie von den von Hebammen geleiteten Entbindungsstationen. Die Zahl der Geburten und perinatalen Todesfälle, die sich außerhalb dieser offiziellen Kliniken ereigneten, wurde geschätzt. Alle perinatalen Todesfälle wurden aufgeschlüsselt; wir ermittelten das Geburtsgewicht, die Todesursache sowie Daten bzgl. der Versorgung der Mutter in der Schwangerschaft.
Bei einer geschätzten Geburtenzahl von 53 665 traten 2103 perinatale Todesfälle auf. 50 138 Geburten (93,4%) erfolgten stationär, 972 (1,8%) vor Ankunft in der Klinik und schätzungsweise 2555 (4,8%) außerhalb der städtischen Versorgungseinrichtungen (Tabelle I).
1714 perinatale Todesfälle (81,5%) traten bei den Klinikgeburten auf; 134 Todesfälle (6,4%) fanden sich unter den Geburten auf dem Weg in die Klinik und bei schätzungsweise 255 Fällen (12,1%) waren die Umstände nicht bekannt (Tabelle II).
Insgesamt 6380 Frauen (12%) waren nicht innerhalb einer Schwangerenvorsorgeeinrichtung erfaßt. 43,2% der perinatalen Todesfälle, das entspricht 909 Kindern, ereigneten sich innerhalb dieses Kollektivs. Die gesamte perinatale Mortalität betrug für Kinder mit einem Geburtsgewicht $\geq$ 500 g 39‰. Unterscheidet man eine Gruppe mit Schwangerenvorsorge und eine Gruppe ohne Schwangerenvorsorge, so lag die perinatale Mortalität in der ersten Gruppe bei 25,3‰, in der zweiten Gruppe bei 142,5‰. Bezogen auf Kinder mit einem Geburtsgewicht $\geq$ 1000 g betrug die perinatale Mortalität 31,6‰.
Nach Feststellung der Todesursache erfolgte eine Klassifikation nach klinischen und einfachen pathologischen Gesichtspunkten unter Berücksichtigung des Geburtsgewichtes (Tabellen IV, V).
Ein Vergleich mit der perinatalen Mortalität in anderen Ländern ist wegen der unterschiedlichen Definitionen, die zur Anwendung kommen, und der uneinheitlichen Terminologie in vielen Veröffentlichungen schwierig. Wir folgten den Empfehlungen der FIGO zur Erfassung der perinatalen Mortalität und Morbidität, die überall zur Grundlage von Erhebungen gemacht werden sollten.
Die Klassifikation der perinatalen Todesfälle nach WIGGLESWORTH (Tabelle V) ist übersichtlich und einfach in der Handhabung; sie liefert wichtige Basisdaten unter Berücksichtigung des Geburtsgewichts. Wir hoffen, unter Anwendung dieser Klassifikation Änderungen der perinatalen Mortalitätsziffern innerhalb des Stadtgebietes richtig erfassen zu können.

Schlüsselwörter: Definition, erfaßte/nicht erfaßte Patientinnen, Klassifikation, perinatale Todesfälle.

Résumé

Revue de la mortalité périnatale en region urbaine dans un pays en voie de développement

On a étudié les morts périnatales survenues dans la ville de Harare, au Zimbabwe, au cours de l'année 1983. On a collecté les données à partir de toutes les naissances connues à l'interieur de la ville. Ces données incluent les nombres exacts à partir des trois maternités centrales hospitalières et à partir des cliniques. Une estimation a été effectuée du nombre de naissances et de morts périnatales survenues à l'intérieur de la ville, mais en dehors de ces maternités officielles.

Toutes les morts périnatales ont été étudiées. On a établi les poids de naissance, les causes de la mort, ainsi que l'enregistrement des soins prénataux maternels. Sur un nombre total de naissance estimé à 53 665, il y a eu 2103 morts périnatales. Ces accouchements comportent 50 138 (93,4%) naissances effectuées dans les hopitaux ou les cliniques, 972 (1,8%) naissances avant l'arrivée au service de maternité et une estimation de 2555 (4,8%) naissances en dehors des services hospitalisers de la ville (tableau I).

Mille sept cent quatorze (81,5%) morts périnatales sont survenues chez des enfants nés à l'hôpital ou en clinique et 134 (6,4%) chez des enfants nés avant leur arrivée au service médical. Un nombre estimé à 255 (12,1%) morts correspond aux morts survenues ailleurs.

Un total de 6380 (12%) patientes n'avaient pas été enregistrées pour des soins anténataux. Il y a eu 90,9 (43,2%) morts périnatales dans ce groupe de patientes non enregistrées.

Le taux global de mortalité périnatale (PNMR) pour les enfants pesant 500 g ou plus est de 39,2/1000. Le PNMR est de 25,3/1000 pour les patientes enregistrées et de 142,5/1000 pour les patientes non enregistrées. Pour les enfants pesant 1000 grammes ou plus le PNMR est de 31,6/1000.

On a établi les causes de la mort pour les 2103 morts périnatales et on les a classé en cause clinique (tableau IV) et par un groupement pathologique simple avec répartition selon le poids de naissance [8] (tableau V).

La comparaison avec la mortalité périnatale dans d'autres pays est difficile en raison de la large variété de définition utilisée ainsi que de la terminologie non définie dans de nombreux articles. Les recommandations du comité de la FIGO sur la mortalité et la morbidité périnatales ont été utilisées dans cette revue et nous recommandons vigoureusement que ces recommandations soient universellement adoptées.

La classification des morts périnatales recommandée par WIGGLESWORTH (tableau V) a été trouvée claire et simple à utiliser et fournit des données de base importantes avec une tabulation selon le poids de naissance. Nous espérons continuer à utiliser cette classification pour surveiller les tendances évolutives de la mortalité périnatale au sein de cette ville.

Mots-clés: Classification, définition, morts périnatales, patientes enregistrées et non enregistrées.

References

[1] AGGARWAL VP, JKG MATI: Review of perinatal mortality at Kenyatta National Hospital, Nairobi. J Obstet Gynaecol East Cent Afr 1 (1982) 1

[2] BROWN I, D ELBOURNE, L MUTCH: Standard national perinatal data: a suggested minimum data set. Community Med 3 (1981) 298

[3] City Medical Officer's Annual Report. Harare 1983

[4] CHALMERS I: The Search for Indices. Lancet ii (1979) 1063

[5] FAIRBROTHER P, MD CONNOLLY: The quality of perinatal care received by patients in the Greater Harare Area during 1973. S Afr Med J 49 (1975) 158

[6] FROST O: Municipal Community Obstetrics in a Developing Country. Trop Doct 10 (1980) 179

[7] Report of the FIGO Committee on Perinatal Mortality and Morbidity from the Workshop on Monitoring and Reporting Perinatal Mortality and Morbidity. Chameleon Press Limited, London 1982

[8] WIGGLESWORTH J: Monitoring Perinatal Mortality. A patho-physiological approach. Lancet ii (1980) 684

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